



Magic Mice

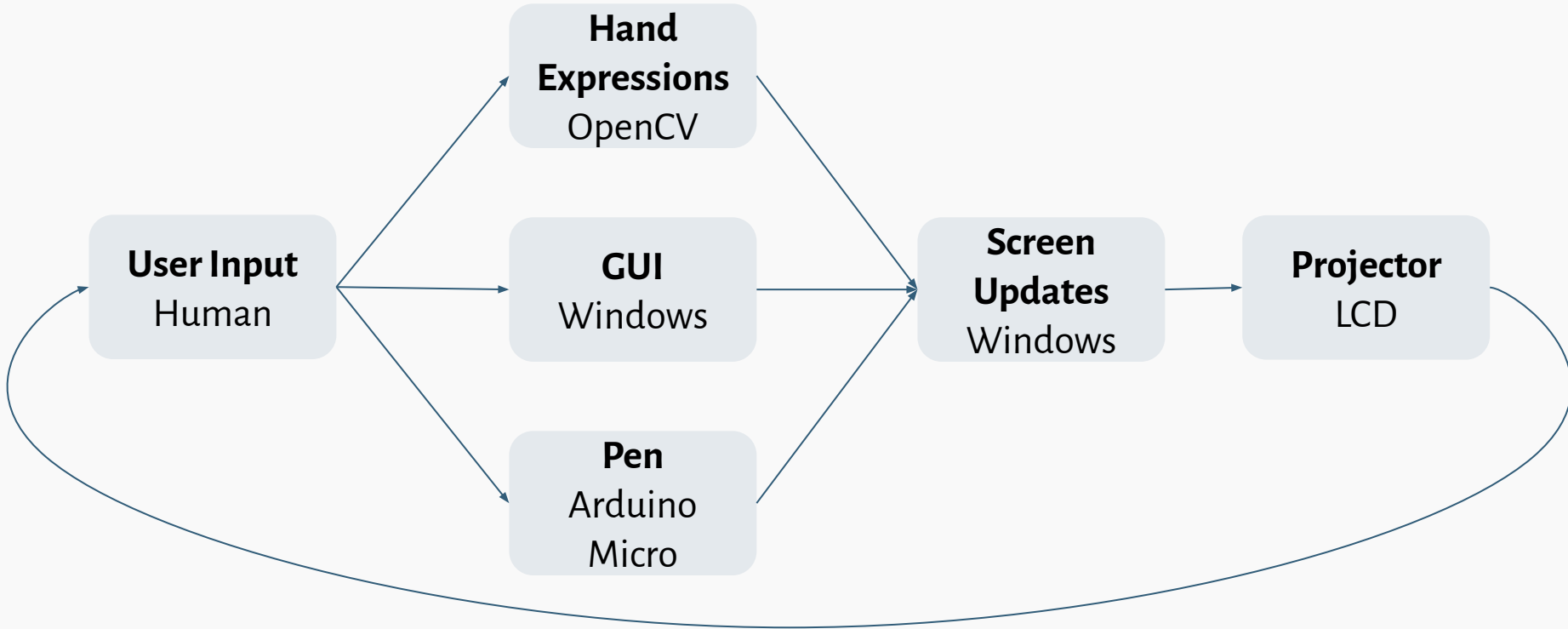
Bradley, Jenny, Jade



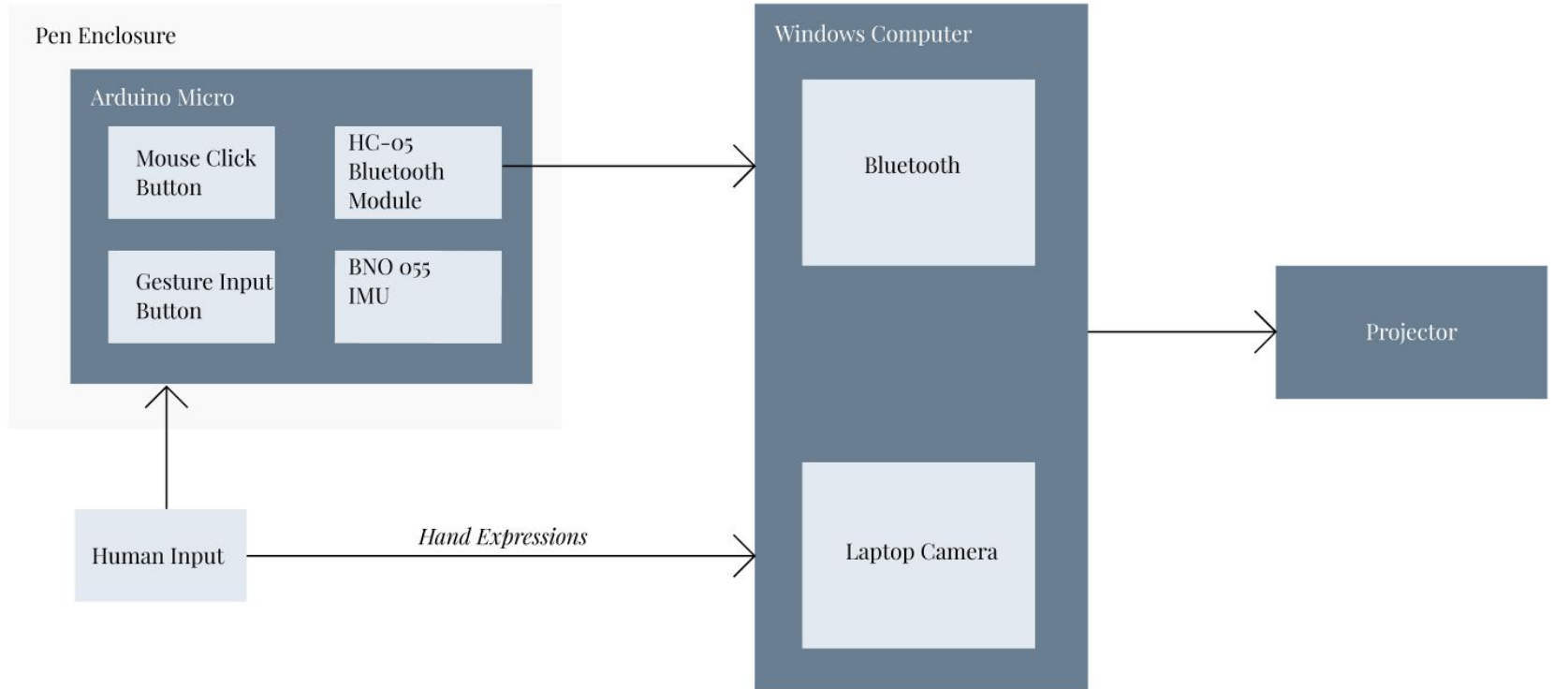
Application Area



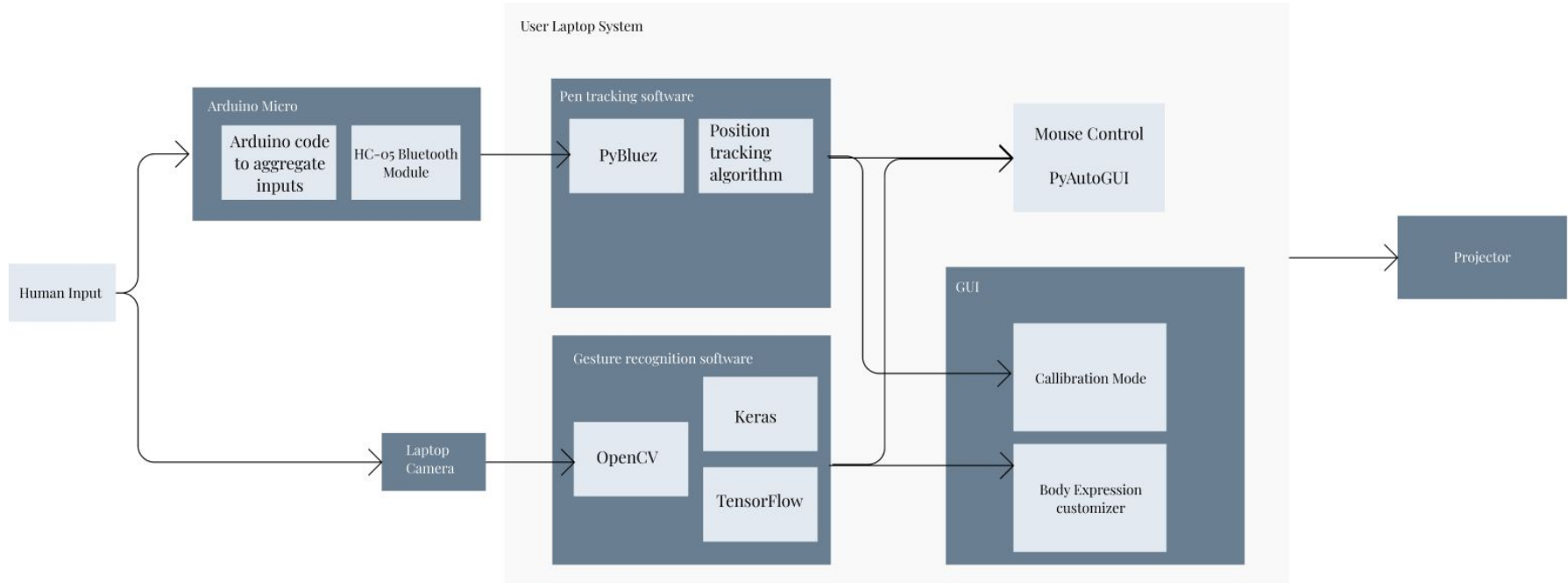
Solution Approach



Solution Design Hardware



System Design Software



Complete Solution



Pen

Mouse tracks pen location on the screen, clicks and hovers



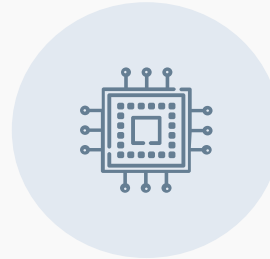
Projector

Displaying the screen and mouse movements



Hand Expressions

Saving new gesture
Running macro



System

Distance calibration
Mouse events

Metrics and Validation

Segment	Metric	Performance
Pen	~1 inches when used with a projector ~50 ms button clicks response ~100 Hz polling rate	~2 inches when used with a projector ~20 ms button clicks response ~50 Hz polling rate
Gesture Recognition	~95% accuracy Add/remove new gestures	~85% accuracy Saves up to 10 different gestures
System/Projector	Calibration for distances of 5-15 ft	Calibration for 5-10 ft

Results

- Pen
 - 50 Hz polling rate
 - Click and drag/draw functionality
 - 20 ms input delay for moving/clicking
 - Accurate to ~2 inches when used with a projector
 - Can calibrate orientation of pen in 0.5 seconds
- Gestures
 - 3 default gestures (fist, open hand, OK sign)
 - User has ability to create their own gestures
 - Can remap gestures to any keyboard shortcuts
- GUI
 - Calibration of camera for pen tracking
 - Management of gestures and macros

Tradeoffs

- OpenCV
 - Added OpenCV as additional input for pen data readings
 - More processing on software side
 - But allowed for more accurate readings
- Accelerometer/Orientation vs Accelerometer/Orientation
 - Accelerometer had quite a bit of drift but allowed the pen to be its own contained unit
 - OpenCV supplemented by orientation data was very accurate/smooth but required more materials
- BNO055 vs. MPU6050
 - BNO055 had more stable gyroscope/orientation readings
 - MPU 6050 was cheaper and simpler to work with
- Windows
 - Switched to MacOS due to lack of compatibility with several Python modules (especially bluetooth)
 - Difficult to work efficiently due to only $\frac{1}{3}$ team members having a Windows system

Project Management

TASK NAME	START DATE	END DATE
Pen		
Code for calibration mode	5/2	5/7
Improve accuracy of pen tracking	5/2	5/10
Assemble pen parts (Arduino, Bluetooth, Buttons, Gyroscope, etc.) into good ergonomics	5/7	5/10
Projector/System		
Create callibration mode	5/2	5/7
Body Expressions		
Remove body expression	5/2	5/4



Recording...

Paul Walhe

Type here to search

go DUTCH!

PERIODIC TABLE OF THE ELEMENTS

The image shows a video recording interface. In the foreground, a man with glasses and a beard is looking at the camera. In the background, there is a whiteboard with a diagram of a person and a tree, and a periodic table of elements. The text "go DUTCH!" is written on the whiteboard. The interface includes a search bar and a taskbar with various application icons.